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ABSTRACT

Higher order thinking is active and sustained cognitive effort directed at solving a complex problem and requires a student to integrate different sources of information, consider alternative perspectives, make critical judgments, and develop and test hypotheses. The important questions in higher order thinking are the ways learners incorporate new conceptions into current cognitive structures and the way they replace conceptions that have become disfunctional with new ones. Cognitive skills play an important role in this process, but the direction of the mind in exactly how to deal with a problem and how to arrive at a viable solution (metacognition) are crucial to creative interactive thought. This paper examines critical thinking as well as curriculum development and teaching strategies. The centrality of the arts of Socratic questioning, accurately reconstructing opposing points of view (reciprocity), and engaging in constructive intellectual exchanges (dialectical reasoning) in an interdisciplinary setting are discussed. Illustrations are taken from L. S. Vygotsky's theory of cognitive development with special emphasis on foreign language curriculum. (DJR)

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15th Annual Conference of the
INTERNATIONAL SOCIETY FOR INDIVIDUALIZED
INSTRUCTION, October 9-11, 1986
Atlanta, Georgia

Theme: Thinking Across the Disciplines

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TITLE OF PROPOSAL: METACOGNITION AND HIGHER ORDER THINKING: AN INTERDISCIPLINARY APPROACH TO CRITICAL THINKING IN THE HUMANITIES

ABSTRACT:

An exploration of critical thinking as well as curriculum development and teaching strategies. The centrality of the arts of Socratic questioning, accurately reconstructing opposing points of view (reciprocity), and engaging in constructive intellectual exchanges (dialectical reasoning) in an interdisciplinary setting will be discussed and illustrated. Special focus on Foreign Language curriculum.

SUMMARY:

Higher order thinking is active and sustained cognitive effort directed at solving a complex problem, with a complex problem being one that requires a student to integrate different sources of information, consider alternative perspectives, make critical judgments, and develop and test hypotheses. There is every reason to believe that critical thinking ought to be the major focus of educational reform. If a person is adept at thinking critically, he is adept at gathering, analyzing, synthesizing, and assessing information, as well as identifying misinformation, disinformation, prejudice, and one-sided "monological" argumentation. A student with such skills will have the tools of life-long learning. Such skills are developed when students are given extensive and continuing opportunities to construct and assess lines of reasoning from multiple conflicting points of view, exercise their creativity, and perceive an underlying interrelationship among a variety of information sources. But beyond the critical and creative skills, it is essential that students be encoraged to reason dialectically or dialogically, that is, empathize with and reason within points of view they oppose as well as within those they support. In spite of profound epistemological differences, the existence of common tasks involved in such higher order thinking-- involving both the cognitive and affective domains-- raises the possibility of transfer of domain-specific critical skills from one discipline to another. Such "tasks" might include: evaluating sources, remaining open-minded, defining the meaning of terms, assessing evidence, using logic, tracing implications, identifying presumptions, constructing simulations.

Critical thinking should do more than equip students for the academic environment, preparing them also for postclassroom life-- i.e., the ability to use knowledge in the real world context. Critical thinking defined in this framework is thus seeing through the surface of things, events, and people to the deeper realities beyond the classroom walls. In a more specific sense, this presentation will explore convergent and divergent social organizations in the classroom whose purpose is to encourage critical thinking and promote natural elements of critical thinking such as sharing ideas with others, questioning others, listening to others, defending one's position, and respecting alternative ideas. Video* illustrations of the Multi-Media Program, the student-instructor Symposium, and the Educational Institution-Community Teach-In will demonstrate interdisciplinary pedagogical techniques which extend beyond the classroom as adjuncts to critical and creative thinking exercised in the classroom setting.

*From courses taught by the author

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Some Conference Issues in My Proposal:

--How does traditional intra-disciplinary education provide an obtaacle to independence of thought?

--How is critical thinking fundamental to all forms of reference and how do we use it to think across and beyond disciplinary boundaries?

--How can micro-skills be orchestrated into macro-abilities in critical thinking?

--How can the instructor provide an atmosphere to become comfortable in thinking dialogically and dialectically in the classroom?

--What can be done to break down the traditional intra-disciplinary allegiances that college faculty typically have, so as to foster greater responsibility for cross-disciplinary critical thinking instruction within discipline-based classes?

--What can be done to foster more "issue" oriented classes in education and to play down memorization of text and lecture materials?

----What is the impact of simulations (based on real-life and hypothetical situations) on critical and creative thinking processes?

-- How are the critical and creative thinking processes intimately related?

Besides the Video excerpts of student presentations, a Bibliography on further reading on the subject as well as other informative handouts will be provided.

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THINKING ACROSS THE DISCIPLINES

METACOGNITION AND HIGHER ORDER THINKING: AN INTERDISCIPLINARY APPROACH TO CRITICAL THINKING IN THE HUMANITIES

. Much of the way we talk about education seems to presuppose an image of the student as a retainer of, rather than a processor of, experience and information. Yet, research repeatedly demonstrates that learning is best thought of as a process of inquiry. The task of learning is primarily one of relating what one has encountered (regardless of its source) to one's current ideas. The student who learns something is the one who understands a new idea (which requires it to be located in a semantic syntactical network of concepts), is the one who judges its truth value (which requires relating the idea to appropriate standards of evidence), and is the one who can judge its consistency with other ideas (which may require alterations in the overall conceptual organization). To learn an idea in any other way is to acquire a piece of verbal behavior which one emits to a stimulus, rather than to understand an idea which one can employ in an intellectually productive way. People are not passive and reactive receptacles into which we can pour the "right" values, the "right" answers, the "right" ways of thinking. People are active and creative beings who need the opportunity to determine goals, issues to be discussed, and the means of evaluating themselves. They learn when they feel that they are a part of what is going on-- when they are personally involved. Learning is not poured into people, learning emerges from people. Essentially, learning takes place through the experiences which the learner has, that is, through the reaction he makes to the environment in which he is placed. Hence, the means of education are educational experiences that are had by the learner. The instructor can provide an educational experience through setting up an

environment and structuring the institution as to stimulate the desired type of reaction.

Given that learning is being viewed as a rational activity here, the important questions in higher order thinking are the way learners incorporate new conceptions into current cognitive structures, and the way they replace conceptions which have become disfunctional with new ones. In order to know his environment, one must act upon it and therefore transform it, displacing, connecting, combining, taking apart, and reassembling it. Perception, learning, and reasoning (cognitive skills) play a role in this process of course, but the direction of the mind in exactly how to deal with a problem and to arrive at a viable solution (metacognitive skills) are crucial to creative interactive thought. In this approach in which learners make their own sense of inputs three processes may be distinguished: conceptual development, conceptual resolution, and conceptual change. Conceptual development involves integrating and differentiating the many concepts of a segment of school knowledge without particular regard to one's beliefs and commitments to ideas about the world. Conceptual resolution, on the other hand, does concern the separate concepts and involves resolving differences in meaning between the real-world uses of those terms and their curriculum use. Cultural stereotypes might persist, for example, in a foreign language context if personal misconceptions are allowed to dominate over instructional insights to the contrary. If, however, the learner abandons his commitment to his set of conceptual understandings by adopting another irreconcilable set, conceptual change is achieved. This abandonment or accomodation is not a component of conceptual learning in every instance. Assimilation of ideas wherein major conceptual revision is not required may result as well. Conceptual change views, however, are important to metac ognition for they emphasize the transformation of conceptions in the process of learning rather

than the mere accumulation of bits of unrelated information. New ideas should not just be added to old ones. They should instead interact with them, sometimes requiring the alteration of both. The deeply entrenched compartmentalization of knowledge, the increasing sophistication of propaganda and mass manipulation techniques, the continuing dominance of rote memori zation and recall of facts as modes of learning, the growth of television and the electronic media, the increasing conflict of opposing ideologies in the global sphere, the acceleration of misunderstanding and stereotypes in international politics, the growing desire for simplistic explanation of life with opposing groups being identified in an essentially manicheistic manner-- all argue for the pressing need for fair-minded critical thinking skills and the ability to interrelate varied and often conflicting views, concepts, information.

Foreign language Curricula and Metacognitive Strategies

A foreign language is an ideal vehicle for modeling the process of learning: organizing a whole body of unchartered territory, identifying, using and evaluating various resources, setting learning objectives, and judging whether goals have been achieved. Being less familiar with the language, culture, history, and author (in the case of foreign language literature courses), the student must exercise a wide range of skills. Primary among such skills are the capacities to develop, test, and affirm or recompose hypotheses; to recognize patterns of internal logic and external implications; and to draw conclusions from evidence. In short, the foreign language curriculum can make a significant contribution to students' development of problem-solving skills from the stage of inference through to that of analytic thought processes. The strategies of conceptualizing, analyzing, evaluating, and synthesizing new experience are inherent in the study of any language whether it be one's native language or a foreign language.

But it is in the expansion of the foreign language program to other disciplines within the Humanities wherein the most challenging aspects of metacognition and creative thought lie. Foreign language courses offer myriad opportunities to contribute to broad educational goals. Moreover, because language is the key to all learning strategies in all disciplines, language faculty have a special responsibility to students and colleagues in other disciplines to provide leadership in developing broad educational goals for students and in conceptualizing departmental roles to achieve these objectives. This is not to say that every effort must be inter- or multidisciplinary or that course pairing or team teaching must be employed. Each of these teaching strategies is laudable in its own framework, but may not always be administratively feasible for the entire curriculum. It is entirely possible to be "interdisiciplinary" in approach in the classroom in a much less formal manner. In this context, it is the instructor's guidance which allows the students to generate ideas and novel approaches to the subject each reflective of his own experiences and specific disciplinary training. This paradigm advances the idea that the deepest objectives of liberal learning-- flexibility of mind and self-reflection-- can best be developed by teaching forms of thinking, rather than by introducing students to specific disciplines. This "modal" approach relies heavily on the architectonics of knowledge, on the superstructure of thought processes and ways of investigation that are held to be common among groupings of disciplines. A creative developmental approach to instruction should thus be toward greater student autonomy, toward tolerance for ambiguity and complexity, and toward the perception of an instructor as a resource, not as an external, authoritative repository of knowledge.

Vygotsky's Theory of Cognitive Development and Creative Group Interaction.

Effective teachers care passionately both about their subject matter and about their students. They are concerned with getting their students to hone their skills in writing and speaking, to extend their abilities in critical thinking and analysis, and to develop their capacities to synthesize, imagine and create. These capacities and skills are the truly enduring effects of higher education. In teaching environments, therefore, adults and more capable peers can describe, demonstrate and explain strategies relevant to task completion. In addition, they can monitor and regulate the learner's problem-solving efforts, keeping them goal-directed. Thus, the externalization of cognitive skills and the transition from other- to self-regulation may be assisted.

We cannot learn what we have not experienced. We learn something roughly in proportion to the degree of experience that we have of it. That being so, the educator should provide learning experiences for his students that reflect the proportions of the objectives that he has already established. The nature of the acquisition of foreign lasnguage skills demands a rich, varied and intensive contact with language-- an active role on the part of the learner. Since second language acquisition is the product of highly complex networks of relationships between linguistic items, it can be learned only if the language is experienced sufficiently for those networks to be built up in the learner, as is true in the case of the mother tongue. Creative Group Interaction effectively combines the cognitive aspects of language learning with the affective aspects of the uniqueness of self. In addition, student-teacher, individual-group, classroom-community relations are enhanced by a group project which allows for individual expression in the target language and, at the same time, peer cooperat ion and class pride in a socio-cultural and linguistic accomplishment. Toward the end of personalizing

foreign language instruction in a non-individualized University setting and encouraging individual imagination and creative thinking, the Creative Group Interaction project requires that students participate in a multi-media, student-directed ensemble exploring a cultural or literary topic through a medium which best suits the student's particular talents. The integration of the foreign language in the program together with relevant course readings and discussions constitute a major focus of the program, which is generally open to the campus community and the public at large. It is important to mention here that many students in our American universities enrolled in lower-division language classes are staisfying a foreign language requirement and have no further motivational factors influencing their study of the language. Thus, it is all the more essential that students become involved, so that interest will not wane and so that a positive experience of foreign language study may be attained. Further, the individualized multi-media projects in which students participate seek natural language use outside the classroom in a well-structured social interaction situation, thus breaking up the traditional classroom student-teacher relationship by taking advantage of the student's personal interests and preoccupations. In each student-oriented instructional program the interrelationship between language and culture, language and ethnicity, and their attendant social and political implications are shown to be important components of the presentation.

Indeed, the claim that learning is enhanced in such social situations is in no way unique. In addition to his widely accepted view that knowledge is socially transmitted, L.S. Vygotsky claims that cognitive processes are transmitted through social interaction. Joint participation in an activity permits cognitive processes to be displayed, shared and practiced, so that the learner is able to modify his or her current mode of functioning. Secondly,

the adult or more capable peer lightens the cognitive "workload" for the learner by taking responsibility for some parts of a task while the learner concentrates on one subcomponent. In current terminology, the expert assumes metacognitive control of the situation, monitoring the novice's activities to ensure that they are appropriate for the task, goal-directed and completed successfully. The expert's metacognitive control is essential in that the novice can gain awareness of and control over mental processes only after those processes have been used and practiced. Moreover, in fulfilling the executive function, the expert has a chance to model important metacognitive processes for the learner. In such a setting involving interactive learning as well as an interdisciplinary approach of multi-talented individuals to convey an idea, a taxonomy of metacognition for planning is suggested. The metacognitive scheme that emerges contains knowledge about human purposes, integrating group desires and values, and what planners call time lining. The focus of knowledge about human purposes might entail such aspects as knowing what people seek to accomplish, knowing thatfacts and raw information have no meaning in the absence of purposes, that purposes can be hierarchically arranged, and that establishing purpose hierarchies is as much an affective process as an analytic, logical one. The focus of knowledge about integrating group desires and values might entail a recognition that members of a group are quite diverse in desires and values, that desires and values are often hidden in people and require extensive fleshing out, that integration is a synthetic process that must avoid the common pitfall of camouflaging or submerging some members' interests and values to those of others, and that effective group integration requires a group process model in which people work as colleagues with equal status, authority and importance,. The focus on time

lining entails an appreciation of how human plans get carried out over a span of time , an understanding of the different phases of a planning cycle, the temporariness of any solution, and the linkage between particular solutions and the specific circumstances-- positive or negative-- under which the task is undertaken.

Numerous studies have shown that there is a close interrelationship between underachievement, failure, and increased negative attitudes. It seems reasonable that the reverse can also be assumed, that success and positive attitudes are related. The successful production of a cultural program from an interdisciplinary perspective by the students themselves in the foreign language thus has a significant impact on the student's self-image and his self-esteem. He feels important as an individual as well as a representative member of the group. He learns to trust himself as a learner and to realize his potential as an individual to make a significant contribution to a class project. Thus students' own motivation levels seem to be increased within the CREATIVE GROUP INTERACTIVE PROCESS. In addition, the following attendant language functions seem to be reinforced by such activities:

--Personalized instruction (instruction assisting student in expressing his/her ideas in the language being learned): Cognitive funtion.

--Specific talent/discipline brought to the performance/personal interpretations: Affective/imaginative function.

--The foreign language used to convey a message about the real world: Representational or informative function.

--Taking the perspective of another culture in a situation alien to individual experience: Empathetic function.

In the structured interaction afforded by Interdisciplinary Creative Group

Activities with their problem-solving focus, the instructor is allowed to personalize foreign language learning even in a non-individualized setting. Such activities encourage imagination and creative thinking and, to a greater extent, open the way to a variety of learning modes.

Vygotsky's claim that psychological processes appear first on an interpersonal level and only later on an intrapersonal plane emphasizes the dynamic nature of cognitive development. Cognitive abilities are neither magically generated in social isolation, nor innately given, nor passively assimilated. Rather, nascent skills emerge and are refined as learners actively participate in supportive contexts that are structured by others.

Cognition, Metacognition and Creativity.

There is a widely held belief among educators and the general public that teaching causes learning. Instructors should negotiate the meanings of the material under study not just teach basic facts to achieve near rote-mode learning. Yet, even with quality educators it must be recognized that learning is a responsibility that cannot be shared-- it must be consciously pursued by the learner. However, the teacher has a responsibility to provide the student with opportunities to help him grasp the meaning of the material studied so that he can choose (or choose not) to learn it. Typical course evaluation methods do not require use of high order, broad, explanatory concepts and/or integrated frameworks of conceptual knowledge. As a consequence, when course examinations are the criterion of achievement, experimental approaches that emphasize use of broad, explanatory concepts and integration of concept meanings will produce little or no improvement in performance. This kind of experimental approach frequently results in some initial decline on conventional course evaluation measures as students struggle to modify their learning patterns from more-rote-mode to more-meaningful-mode

approaches. But after this period of adjustment, students may equal or exceed their conventional-learning counterparts. The central focus of all studies dealing with higher order thinking and creativity is always on the nature of problem solving and evaluation of instructional strategies to improve students' problem solving abilities. Socratic questioning and dialogical practice are often considered significant techniques in the development of problem-solving skills , particularly in the process leading from inference to analytic thought. Such processes are designed to foster the habit of reflective thinking rather than the habit of looking to an instructor, a book, or a formula for a ready-made answer. A Socratic questioner probes deeply for reasons, clarifications, explanations and evidence, helping us to see what grounds or lack of grounds we have for our beliefs. At times, the technique of reciprocity is used in interactive group exchanges (as opposed to didactic lectures). This process allows the student to enter into points of view which he opposes, reasoning within them (an exercise in conflict resolution). Herein we can clearly see the interaction among the processes of cognition, metacognition and creativity most clearly.

Cognition deals with the acquisition, retention and manipulation of meanings. These meanings are relational. Sensation, perception and attention deal with the "extractions" of relations from our environments; memory is, by and large, the "storage" of meaningful relations and their use in thought and problem solving. Understanding the nature of relations, therefore, is a giant step toward understanding co gnition. These basic conceptual relations exist in all disciplined knowledge. Obviously, each discipline investigates different phenomena, but each deals with conceptual relations, for relations underlie all meaning. Metacognition refers to a person's cognition about cognition,

that is, the person's knowledge of cognitive processes and states such as memory, attention, knowledge, conjecture, illusion. Of interest here is not how the person executes these processes but what he knows and believes about these processes. The premise behind research in this domain is that persons not only cognize about objects, events and behaviors, but more importantly they also cognize about cognition itself. They form and hold conceptions about how the mind works, about which mental problems are difficult, which easy, about their own mental states and processes. Creativity, making use of both cognition and metacognition, is the ability and emotional proclivity to form higher order integrative reconciliation, that is, the meanings of two or more concepts are seen as related in a new and significant way. Rote learning not only fails to provide the basis for integrative reconciliation but tends to inhibit search for it as does much of school learning and evaluation. As new knowledge is acquired through meaningful learning situations, however, subsuming concepts (the functional unit in the memory of each individual) undergo progressive differentiation. In this way, new events or objects or concepts labeling regularities in new events or objects are seen as substantively related in the form of new propositions that include the original subsumer. Progressive differentia tion and integrative reconciliation are not principles of instructional design, but are key learning principles.

People become educated, as against trained, insofar as they achieve a grasp of critical principles and an ability to choose, organize and shape their own ideas and living beliefs by means of them. Education is not a mere piling up of more and more bits and pieces of information. It is a process of autonomously deciding what is and what is not true and false. It implies a self-motivated action upon our own mental nature and a

participation in the forming of our own character. It is a process in which we learn to open our own mind, to correct and refine it, to enable it rationally to learn; thus to empower it to analyze, digest, master and rule its own knowledge, to gain command over its own faculties, to achieve flexibility, fairmindedness, and critical exactness. By teaching critical thinking within an interdisciplinary and student-centered, active-oriented setting (utilizing the cognitive, metacognitive, and creative skills to their maximum), educational institutions can perhaps begin to become, as they should be, leading institutions in society, paradigms of rationality, helping an irrational society become what it itself has said is its own highest goal: a free society of free and autonomous individuals.